

AMENDMENTS TO THE SPECIFICATION:

Page 1, please add the following new paragraphs before paragraph [0001]:

[0000.2] CROSS-REFERENCE TO RELATED APPLICATIONS

[0000.4] This application is a 35 USC 371 application of PCT/DE 2004/002139
filed on September 24, 2004.

[0000.6] BACKGROUND OF THE INVENTION

Please replace paragraph [0001] with the following amended paragraph:

[0001] ~~Prior Art~~ **Field of the Invention**

Please replace paragraph [0002] with the following amended paragraph:

[0002] The invention is based on a commutator for an electrical machine, ~~as generically defined by the preamble to claim 1. Such a commutator has~~ **having** a plurality of laminations[[,]] which have contact faces and are separated from one another by slots.

Please add the following new paragraph after paragraph [0002]:

[0002.5] Description of the Prior Art

Please replace paragraph [0003] with the following amended paragraph:

[0003] In operation **of electrical machines** [[,]] so-called brush noise can occur. The commutator is the primary excitation source for this. On the one hand, the brush is entrained via the friction of the contact face of the commutator and brush. The brush is excited to oscillate by what is known as the stick-slip effect. Moreover, among other factors, the imbalance that is due to dimensional inaccuracies [[(]]such as errors of concentricity, eccentricity, lamination discontinuities, etc.[]], excites the commutator to oscillate. The lamination slots of the commutator have particular significance in this respect. Each slot -

because of the radial prestressing - causes the brush edge to slip the slot upon a rotation and excites it to travel. After that, the brush is forced out of the slot again, as a result of which it experiences both travel and force excitation. Especially the excitations at the exit are amplified here by the lamination discontinuity. The travel excitation is limited to the radial direction of the brush, while a force excitation occurs in the tangential direction. The number of laminations of the commutator has a primary influence on the frequency range affected. The corresponding slot frequency (f_N) depends on the number of laminations (i_L) and on the frequency of rotation of the commutator (ω_K). The result is the following formula: $f_N = i_L * \omega_K$.

Page 2, please replace paragraph [0004] with the following amended paragraph:

[0004] ~~Advantages of the Invention~~

SUMMARY AND ADVANTAGES OF THE INVENTION

Please replace paragraph [0005] with the following amended paragraph:

[0005] The commutator of the invention for an electrical machine ~~having the characteristics of claim 1~~ has the advantage over the prior art of making a favorable influence on the noise produced possible. To that end, the commutator has a plurality of laminations, which have contact faces and are separated from one another by slots; in at least some of the laminations, at least one groove is provided in the contact face and extends essentially in the longitudinal direction of the respective lamination. As a result, the incident slot frequency can be increased, so that by way of this the frequency range and hence the excitation of the brush are

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varied. The goal is to vary the slot frequency such that the resultant brush oscillations are outside the problematic range.

Please replace paragraph [0007] with the following amended paragraph:

[0007] The laminations remain mechanically quite stable if the depth of the grooves amounts to only a portion of the thickness of the laminations, preferably **about** 0.5 mm.

Page 3, please delete paragraph [0012].

Please replace paragraph [0013] with the following amended paragraph:

[0013] ~~Drawing~~ **BRIEF DESCRIPTION OF THE DRAWINGS**

Please replace paragraph [0014] with the following amended paragraph:

[0014] One exemplary embodiment is shown in the drawing and described in further detail in the ensuing description, **taken in conjunction with the drawings, in which: [[.]]** ~~Shown are:~~

Please replace paragraph [0015] with the following amended paragraph:

[0015] Fig. 1[[,]] **is a schematic illustration of** a drive unit;

Page 4, please replace paragraph [0016] with the following amended paragraph:

[0016] Fig. 2[[,]] **is a sectional view of** a hook commutator, in longitudinal section, **of the driven unit;**

Please replace paragraph [0017] with the following amended paragraph:

[0017] Fig. 3[[,]] **is** an end view of the hook commutator of Fig. 2; and

Please replace paragraph [0019] with the following amended paragraph:

[0019] ~~Description of the Exemplary Embodiments~~

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Please replace paragraph [0021] with the following amended paragraph:

[0021] In Figs. 2 through 4, a commutator 16 **of the electrical machine 10** is shown. The commutator 16 has a cylindrical commutator core 18 of a thermosetting plastic, which is surrounded by a metal conductor sleeve ~~[[()]]20[()]]~~, particularly of copper. A receiving bore 22, in which the armature shaft, not shown, of the electrical machine 10 is located, extends in the commutator core 18.

Page 5, please replace paragraph [0024] with the following amended paragraph:

[0024] The spacing 32 of the slots 24 and of the grooves 30 is uniform. In the present exemplary embodiment, this spacing 32 is the angle from a slot 24 to the adjacent groove 30, or from a groove 30 to the adjacent groove 30, referred to the center axis 31 of the commutator 16. This spacing 32 or angle is calculated as $360^\circ/i_s$, where i_s is the total number of slots 24 and grooves 30. In the present exemplary embodiment, there are eight slots, which form eight laminations. Two grooves are provided on each lamination, resulting in $2 * 8 = 16$ grooves. The result is $i_s = 8 + 16 = \text{[[36]] } \underline{24}$. The spacing 32 is thus ~~[[10]]~~ **15°**.

Page 6, please replace paragraph [0026] with the following amended paragraph:

[0026] The depth 34 of the grooves 30 amounts to only a portion of the thickness of the laminations 26, preferably **about** 0.5 mm. However, other depths are also possible. It is also conceivable for the grooves 30, like the slots 24, to divide the laminations into portions.

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Please replace paragraph [0027] with the following amended paragraph:

[0027] As is shown more clearly in Fig. 4, the diametrically opposed edges 36 of adjacent laminations 26 are provided with chamfers 38, which extend longitudinally. The edges 40 of the grooves 30 are also provided with a chamfer 38. The chamfers 38 form an acute angle, preferably of 15° to 20°, with the contact face 27 of the respective lamination 26. The chamfers 38 should be dimensioned such that a sufficiently large contact face 27 remains for the brushes.

Please add the following new paragraph after paragraph [0028]:

[0029] The foregoing relates to a preferred exemplary embodiment of the invention, it being understood that other variants and embodiments thereof are possible within the spirit and scope of the invention, the latter being defined by the appended claims.